



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/579,686

05/18/2006

Nobuhiro Kondo

SUZU1650

9588

44654 7590 11/12/2008  
SPRINKLE IP LAW GROUP  
1301 W. 25TH STREET  
SUITE 408  
AUSTIN, TX 78705

EXAMINER

HAJNIK, DANIEL F

ART UNIT

PAPER NUMBER

2628

MAIL DATE

DELIVERY MODE

11/12/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/579,686 | <b>Applicant(s)</b><br>KONDO, NOBUHIRO |  |
|                              | <b>Examiner</b><br>DANIEL F. HAJNIK  | <b>Art Unit</b><br>2628                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 April 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Specification***

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

### ***Drawings***

1. Color photographs and color drawings are not accepted unless a petition filed under 37 CFR 1.84(a)(2) is granted. Any such petition must be accompanied by the appropriate fee set forth in 37 CFR 1.17(h), three sets of color drawings or color photographs, as appropriate, and, unless already present, an amendment to include the following language as the first paragraph of the brief description of the drawings section of the specification:

The patent or application file contains at least one drawing executed in color. Copies of this patent or patent application publication with color drawing(s) will be provided by the Office upon request and payment of the necessary fee.

Color photographs will be accepted if the conditions for accepting color drawings and black and white photographs have been satisfied. See 37 CFR 1.84(b)(2).

### ***Claim Rejections - 35 USC § 101***

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Art Unit: 2628

Claims 1-12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim(s) 1-6 is/are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory “process” under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled “Clarification of ‘Processes’ under 35 U.S.C. 101”). The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

Claims 7-12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. That is, the claims are directed to a program product, where the claim as a whole is directed towards software. For example, in claim 7, the means are means for instructing a computer to perform operations by way of software codes (see page 14, lines 7-9 of the specification). When, the claimed components are software or program codes, the claim is essentially a data structure, per se. Data structures are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. Such claimed data structures do not define any structural and functional interrelationships between the

Art Unit: 2628

data structure and other claimed aspects of the invention which permit the data structure's functionality to be realized.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3, 5-9, 11-13, 15, and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Museth et al. (US Pub 2008/0074419).

As per claim 1, Museth teaches the claimed:

1. An image processing method using a computer, comprising:

extracting vertex coordinates of a triangular-shaped polygon ([0111], “*This section describes an algorithm for calculating a distance volume from a 3D closed, orientable polygonal mesh composed of triangular faces, edges, vertices, and normals pointing outwards” where retrieving or loading the vertices from memory for use in the distance calculations is extracting of vertex coordinates*);

setting a region surrounding the triangular-shaped polygon on the basis of the vertex coordinates ([0056], “*defining the region of influence (ROI), i.e. the region where ( ) should be non-zero.*

*This is done by either the user interactively placing a 3D object around the region, or by*

Art Unit: 2628

*automatically calculating a region from properties of the surface*” where the surface properties includes vertex coordinates);

measuring a distance from a lattice point included in the region to the triangular-shaped polygon ([0056], “The second step, step 48, consists of calculating a distance measure to the ROI primitive”; [0058], “In Eq. (8a)  $d$  denotes the distance from a point on the level set surface to the closest point in the point set  $p$ . In Eq. (8b)  $d$  denotes a signed distance measure from a point on the level set surface to the implicit surface  $s$ ”; lattice points are shown in figure 12); and drawing a graphic figure on the basis of the distance from the lattice point to the triangular-shaped polygon ([0195], “In this way, computer 1001 is able to display the results of the computation to a user in the form of output” and in the abstract, “For example, shortest distance calculations, bounding boxes, numerical integration, and the sparse-field methods are disclosed for the implementation of the level set deformation operator embodiments including blending, smoothing sharpening, and embossing. The resulting level sets model can be volume rendered”).

As per claim 3, Museth teaches the claimed:

3. The method according to claim 1, wherein the distance from the lattice point to the triangular-shaped polygon is given as data which is accompanied with a sign indicative of whether the lattice point is outside or inside the graphic figure drawn by the polygon ([0058], “In Eq. (8a)  $d$  denotes the distance from a point on the level set surface to the closest point in the point set  $p$ . In Eq. (8b)  $d$  denotes a signed distance measure from a point on the level set surface to the implicit surface  $s$ . The signed distance measure does not necessarily have to be Euclidean distance--just a monotonic distance measure following the positive-inside/negative-outside convention”).

Art Unit: 2628

As per claim 5, Museth teaches the claimed:

5. The method according to claim 1, further comprising: dividing a drawing region of the graphic figure, which is drawn by the triangular-shaped polygon, into a plurality of meshes; and further dividing the mesh, in which an outline of the graphic figure is present, into a plurality of meshes, wherein said region is set for each of the meshes ([0179] *“One of the most effective techniques for increasing interactivity in the present level set editing system involves restricting computations to a subregion of the volume dataset”* where determining subregions is dividing the mesh; [0189] *“Next, for each subsequent iteration of the level set calculation, new triangles are only extracted from the sub-volume defined by the bounding box”, for each bounding box, the triangles contained in that box is a mesh, the plurality of bounding boxes creates a plurality of meshes. In this case, the dividing of the graphic is on a graphic which is already drawn, see figure 1, where drawing is performed in piece 32 and there is a feedback loop that returns processing to the level set calculation in piece 26 even once rendering has been performed in piece 32. an iterative level set calculation is being performed several times after the graphic figure is already drawn in iterations; The reference also teaches of dividing in other instances: [0180], *“Employing bounding boxes within the local level set editing operators ... significantly lessens the computation time during the editing process ... For the smoothing, sharpening and embossing operators, the user specifies the portion of the model to be edited by positioning a region-of-influence (ROI) primitive”*; The outline is present due the subvolumes containing a portion of the object's surface).*

Art Unit: 2628

As per claim 6, Museth teaches the claimed:

6. The method according to claim 2, wherein a surface of the graphic figure is drawn by transforming a parametric representation using the polygon to an implicit-function representation *(in the abstract, “The method involves defining and forming a level set surface model” and [0012], “Level set models are deformable implicit surfaces where the deformation of the surface is controlled by a speed function in the level set partial differential equation”; the transformation is shown in figure 1).*

As per claim 7, the reasons and rationale for the rejection of claim 1 is incorporated herein.

Museth teaches the claimed:

A computer program product for processing ([0201], “Application code may be embodied in any form of computer program product”).

As per claims 9, 11, and 12, these claims are similar in scope to claims 3, 5, and 6, respectively, and thus are rejected under the same rationale.

As per claim 13, the reasons and rationale for the rejection of claim 1 is incorporated herein.

Museth teaches the claimed:



Art Unit: 2628

An input unit configured to receive polygon data (*in the abstract, "One embodiment takes scan converts input models such as polygon mesh, NURBS, CSGS models into level set models"*).

As per claims 15 and 17, these claims are similar in scope to claims 3 and 5, respectively, and thus are rejected under the same rationale.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2, 4, 8, 10, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Museth.

As per claim 2, Museth does not explicitly teach the claimed limitations, however suggests the claimed features as follows:

2. The method according to claim 1, wherein the graphic figure is drawn as a set of points at which the distance to the triangular-shaped polygon is zero (*in figure 10 and [0056], "The second step, step 48, consists of calculating a distance measure to the ROI primitive. This is followed by step 50, which involves defining a function that smoothly approaches zero at the boundary of the ROI" and [0058], "Note that .sub.p(d) is one when the shortest distance, d, to*

Art Unit: 2628

*the point set is smaller than  $d_{sub.min}$ , and decays smoothly to zero as  $d$  increases to  $d_{sub.max}$ , after which it is zero". The reference teaches of drawing in figure 1, step 32).*

It would have been obvious to one of ordinary skill in the art at the time of invention to applying distance to the polygon as zero to all of the points in graphic figure in Museth in order to better represent complication surface shapes and more flexibility in handling the changes in topology.

As per claim 4, Museth does not explicitly teach the claimed limitations in their system, however Museth suggests the limitation in the background.

4. The method according to claim 1, further comprising converting all of a plurality of polygons that form the graphic figure into triangular-shaped polygons, prior to the step of extracting the vertex coordinates of the triangular-shaped polygon (*in figure 1, step 14, "3D Scan Conversion" where this is performed prior-to extracting because it is a preprocess in the figure, and in [0009] "3D scans can be converted to polygonal and parametric surface meshes. Many algorithms and systems for editing these polygonal and parametric surfaces have been developed" and [0111], "a 3D closed, orientable polygonal mesh composed of triangular faces, edges, vertices, and normals pointing outwards" where triangular faces result after pre-processing*).

It would have been obvious to one of ordinary skill in the art at the time of invention to apply the scan conversion in Museth in order to better handle scanned raw volume data by running a conversion algorithm on it to retrieve usable triangular mesh data for subsequent processing.

Art Unit: 2628

As per claims 8, 10, 14, and 16, these claims are similar in scope to claims 2, 4, 2, and 4, respectively, and thus are rejected under the same rationale.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:  
see PTO form 892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel F. Hajnik whose telephone number is (571) 272-7642.

The examiner can normally be reached on Mon-Fri (8:30A-5:00P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka J. Chauhan can be reached on (571) 272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel Hajnik/  
Patent Examiner  
Art Unit 2628

/Ulka Chauhan/  
Supervisory Patent Examiner, Art Unit  
2628

Application/Control Number: 10/579,686

Page 11

Art Unit: 2628